UCRL-MA-133867

ES and H manual

Environment, Safety, and Health

Volume III

Part 31: Discharge to Air

31.1
Air Quality Compliance

(Formerly ECM C12)

Recommended for approval by the ES&H Working Group

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New document or new requirements

Approval date: January 21, 2000

Minor revision, no new requirements

Approved by: Environmental Protection Department

Approval date: September 16. 2002

Revision 1

This work performed under the auspices of the U.S. Department of Energy by University of California Lawrence Livermore National Laboratory under Contract W-7405-ENG-48

31.1

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Contents

* Minor revision

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Air Quality Compliance

1.0 Introduction

Air pollution's impact on public health and the environment can be substantial and has resulted in regulation through federal, state, and local government agencies. Laws and regulations governing air quality can be divided into two groups: those that deal with pollutants generated mostly by combustion ("criteria pollutants"), and those that deal with compounds known as toxic air contaminants (a California term for air toxics—also called hazardous air pollutants [HAPs] under federal law). Toxic air contaminants have the potential to increase the likelihood of cancer or reproductive disorders as well as to cause acute or chronic health effects.

In California, sources of air pollution are largely regulated through a permit system and prohibitory rules. This system is designed to require permitting of equipment or processes that may emit air pollutants. Permits may be required for: (1) new equipment or operations that may cause air pollution; and (2) modifications to equipment, throughputs, processes, or materials.

The air permitting process is driven, in part, by the federal Clean Air Act (CAA). The purpose of the CAA is to protect the public health of the most sensitive portion of the population, such as children, the elderly, and those with allergies, asthma, or emphysema. The U.S. Environmental Protection Agency (EPA) is responsible for promulgating nationwide standards, oversight of air quality planning, and regulatory implementation conducted by the state and local air districts. The State of California Air Resources Board (ARB) is responsible for adopting state ambient air quality standards and for regulating vehicular sources of air pollution. At the regional level, local air districts are responsible for implementing federal and state air quality standards. Most often the agencies pursuing enforcement actions against facilities not in compliance with the regulations are the local air districts.

The EPA establishes National Ambient Air Quality Standards (NAAQS). California delegates responsibility for attaining the NAAQS to Air Pollution Control Districts (APCDs)/Air Quality Management Districts (AQMDs). LLNL is regulated by two air districts. They are: (1) the Bay Area Air Quality Management District (BAAQMD) for the Livermore site, and (2) the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) for Site 300. Additionally, the State of California has also established its own California Ambient Air Quality Standards (CAAQS), and a California Clean Air Act (CCAA). Both the CAAQS and the CCAA are more restrictive than federal requirements.

Emissions of radionuclides are not currently regulated at the local level. Standards for radionuclide emissions to air are promulgated and enforced directly by the EPA, and are based on doses to the public rather than on emissions or concentrations. This special class—radioactive air pollutants—is especially important at LLNL; see Section 3.0 below.

2.0 Criteria Pollutants

Criteria pollutants are regulated by the federal CAA and CCAA based upon an area's classification. The classification for each pollutant in a given area indicates whether or not the area meets the NAAQS. If the area meets the health-based standards, it is an "attainment area." If the area exceeds the standards, it is a "nonattainment area." There is also the category of "unclassified," which is an area that does not have enough monitoring data to determine its classification. These areas are treated as attainment areas for purposes of regulation.

An area's designation as attainment or nonattainment area determines what permitting regulations are applicable to any new or modified sources. In a nonattainment area, the amount of regulation is also dependent upon a further subcategory that indicates the severity of nonattainment. The subcategory determines the amount of regulation (rules, regulations, and requirements) that are applied in the area in the attempt to meet the NAAQS.

On June 25, 1998, EPA redesignated BAAQMD from attainment to nonattainment for ozone. The SJVUAPCD is classified as a nonattainment area for ozone. In fact, the air quality in the SJVUAPCD is deteriorating more rapidly than any other area in the nation. As a result, the future levels of air pollution regulation are expected to increase within the SJVUAPCD. The San Joaquin Valley also experiences violations of the state standards for both ozone and particulate matter (PM).

2.1 Pollutant Categories

Several pollutants released to the atmosphere are of major concern to the environment, including the six "criteria pollutants": sulfur oxides, nitrogen oxides, volatile organic compounds, PM-10 (particulate matter of respirable size) and PM-2.5 (fine particulates), carbon monoxide, and lead. The level of these "criteria pollutants" is used as an indicator of ambient air quality and the basis for the attainment or nonattainment classification.

Volatile organic compounds (VOCs) are of particular concern to the air districts and are divided into two categories: precursor organic compounds (POCs) and nonprecursor organic compounds (NPOCs). The POCs are so named because they are chemical precursors that react with nitrogen oxides at ground level in the presence of sunlight to form photochemical "smog" of which ozone is a primary constituent. For this reason, air districts are particularly interested in reducing POCs and NO_X. The NPOCs include solvents such as methylene chloride, 1,1,1-trichloroethane, and the family of chemicals referred to as freons. Freons are subject to regulation because they are believed to deplete ozone in the stratosphere. The list of compounds classified as nonprecursors is not the same in the BAAQMD and the SJVUAPCD.

2.2 Regulating Emissions

California air districts are required to regulate emissions to reduce ambient levels of pollutants and to ensure that both the CAAQS and the NAAQS are not violated. Most California air districts are not in compliance with the California ozone standard. The CCAA requires air districts to reduce their emissions by 5 percent per year retroactive to the base year 1987 in order to attain the CAAQS. Each air district is required to submit a Clean Air Plan to the ARB that identifies new measures to be implemented to achieve the mandated reductions in the district's emission inventory. To help accomplish this reduction in emissions, local districts require facilities to obtain air permits for equipment/operations that emit air pollutants and to comply with prohibitory rules.

One requirement of the CCAA is known as "No Net Increase." This provision of the law prevents any air district from issuing any air permit that represents a growth in emissions above the level established on January 1, 1988. To comply with this provision, local districts require that offsetting emissions from existing sources be obtained as part of the district's permitting program. LLNL has adopted an Air Emission Offsets Management Plan, which guides Laboratory efforts in providing offsets (see Air Emission Offsets Management Plan at the end of this document).

At the current time, LLNL is eligible to obtain offset credits from the district's Small Facility Bank, allowing LLNL to borrow offsets as long as its growth stays below district-specified limits. Should LLNL exceed the limits, all offsets borrowed from the bank would have to be repaid and the Air Emissions Offsets Management Plan would be in full effect again.

2.3 Process for Compliance for Permitted Sources

To acquire an air permit from the local district or determine if equipment or processes are exempt from permitting, LLNL program personnel should contact an air quality specialist from EPD's Operations and Regulatory Affairs Division's (ORAD's) Terrestrial, Atmospheric, Monitoring, and Modeling (TAMM) Group and provide answers to the following questions:

- What chemicals are being used? Include the composition of paints, coatings, and adhesives, as well as material safety data sheets (MSDSs).
- What quantities of chemicals are being used?
- What is the type of operation or equipment (painting, solvent cleaner, boiler, fume hood, etc.)?
- What are the release points (stack information height, diameter, flow rate, and location)?
- What is the maximum frequency of emissions? (For example, is it a one-time puff, continuous, 4 hours/day, 2-5 days/month, etc.?)
- Is there abatement equipment (high-efficiency particulate air [HEPA] filters, scrubber, baghouse, etc.)?
- What is the efficiency of the abatement equipment?
- Describe the equipment. Include a manufacturer's catalog description or an engineer's drawing, etc.
- Describe the project. (What does it do? Does it produce any waste? Include a flow diagram of the process.)
- When will the equipment be installed? How long will it be in operation?

The local air district lists some equipment and operations that are considered insignificant sources of air pollution. These sources are exempt from local air district permitting. The air permits specialist can assist the Responsible Individual in making a determination whether an activity is exempted or requires an air permit. A source may be exempted from an air district permit, but may require recordkeeping to ensure that the activity is operated within the parameters of the exemption.

A Permit to Operate can take up to a year to obtain, but may take much less time. The reason for this is that there are three stages for processing an air permit.

- The first stage is the completion of the application.
- The second stage is the Authority to Construct, which is issued by the local air district. An Authority to Construct must be obtained from the regulator before

construction or modification begins on the equipment that will emit the pollutants. The program should not purchase or fabricate new equipment that may emit air pollutants until LLNL has received an Authority to Construct.

- The last stage is the Permit to Operate, which specifies final operating conditions. Permits may be rescinded at any time for a violation of regulations or permit conditions.

2.4 Responsibilities

The Environmental Protection Department (EPD) provides air quality assistance to the programs through ORAD. Additionally, EPD is responsible for paying permit fees assessed by the air district. The following are general responsibilities of LLNL's internal organizations.

Key personnel and organizations that help LLNL programs to meet their responsibilities are:

- Air permits specialists, who are members of TAMM, and typically members of the EPD Environmental Support Teams, evaluate the need for an air permit, obtain permits, perform air compliance assessments, determine compliance with the LLNL Air Emission Offset Management Plan, maintain copies of permit records issued by BAAQMD and SJVUAPCD, and renew permits if there are no changes in the equipment/operations. They coordinate any related agency contact or inspections of permitted equipment with the programs and respond to enforcement action, such as a Notice of Violation (NOV) or Notice to Comply. When a potential air emission source is identified, the program consults with the assigned air quality specialist to determine whether a permit is required. Programmatic people can find out who their air quality specialist is by contacting the Environment, Safety, and Health (ES&H) Team environmental analyst.
- ES&H Team environmental analysts, who are members of the Environmental Operations Group (EOG) of ORAD and the EPD Environmental Support Teams, assist the programs and the air quality specialists in locating and identifying potential sources of air emission. They check permitted equipment to ensure that the Responsible Individual understands the regulations and permit conditions associated with the equipment. EOG analysts are familiar with the more common air emission sources within various programs.

2.5 Applicability to LLNL Activities

Currently, LLNL has approximately 150 Permits to Operate. All new and modified LLNL activities that emit air pollutants may require permits and need to comply with air permit operating conditions and prohibitory rules. Failure to comply with these requirements can result in the issuance of a NOV, which may include penalties, fines, and adverse publicity. In extreme cases, criminal penalties may be sought. In a case of continuing violations, an air district could shut down a permitted unit.

3.0 Air Toxics

The BAAQMD regulates 141 compounds as toxic air contaminants. Each compound has a threshold value, which determines if a health risk screening needs to be conducted as part of a permit application. If the calculated risk from the screening of a given source is high, LLNL must complete a full health risk assessment and mitigate the emissions. The compounds reviewed by the SJVUAPCD include the 130 HAP compounds plus those compounds identified under the California AB 1807 process.

In the federal system, National Emission Standards for Hazardous Air Pollutants (NESHAPs) are being implemented through local district regulations, with the exception of radionuclide NESHAPs (discussed below). There are currently 189 HAPs listed in the CAA. Congress established this list in the CAA, rather than allowing EPA to establish a list. EPA is in the process of developing categories and emission limits for sources that emit HAPs.

3.1 Process for Compliance

The information needed by the local air district to conduct a health risk screening is the same as that required for the criteria pollutants and identified in Section 1.3 except the quantity or concentration must be included for each toxic air contaminant.

If your operations require that you use new toxic air contaminants or have any changes in the quantities, the equipment, or the processes used, check with your permits air quality specialist to determine if there are any air permitting requirements that apply.

4.0 Radioactive Air Pollutants

4.1 Standards for Release of Radiation

Radioactive substances used at LLNL include tritium, uranium, transuranics, mixed fission products, and biomedical tracers. EPA and DOE require LLNL to perform assessments of the radiological doses to the public resulting from LLNL operations, and

to report these assessments annually. LLNL must demonstrate compliance with the radiation protection standards promulgated by these federal agencies.

The principal standards for airborne emissions of radionuclides are those defined in 40 CFR 61, Subpart H, which limit air emissions from DOE facilities. DOE facilities are prohibited from emitting radionuclides in amounts that would cause any member of the public to receive in any year an effective dose equivalent (EDE) of 10 mrem/y or greater. In addition, continuous monitoring of radionuclide effluent is required at all release points where emissions could cause an EDE in excess 0.1 mrem/y. In this determination, the estimated radionuclide release rates shall be based on the discharge of the effluent stream that would result if all pollution control equipment did not exist, but the facilities operations were otherwise normal. An application to construct a new facility or modify an existing one does not need to be filed with the EPA so long as the offsite EDE from any emission point from the new or modified facility is less than 1 percent of the 10 mrem/y standard, taking credit for emission abatement devices.

Demonstrations of compliance with radiation protection standards must use methods approved by the EPA; in particular, the EPA must approve sampling, monitoring, and abatement methods and the calculational models for dispersion and dosimetric assessments.

4.2 Responsibilities

To ensure compliance with radionuclide emission standards, two questions need to be answered prior to initiating a new project or significantly modifying an existing one: (1) Is continuous monitoring of radionuclide air effluent from a particular exhaust point required? (2) Is it necessary to obtain EPA approval for start-up of the project? The TAMM Group provides guidance and calculations to help the Responsible Individual answer these questions, and (if needed) provides regulatory representation.

Beyond this preliminary radiological emissions review process, the programs must annually demonstrate compliance with the regulation. EPD relies on program personnel to respond to requests for information regarding radionuclide usage. Program personnel should consult their ES&H Team ES&H Team environmental analyst for assistance in contacting a TAMM representative if they require assistance with radiological emissions issues.

The requirements to report on activities having the potential to release radionuclides to the air are satisfied by two annual reports—both the responsibility of ORAD. Detailed information on radionuclide sources, facilities, control programs, monitoring and modeling activities, impact assessments, and other aspects of operations at LLNL involving radionuclides is provided in the NESHAPs Annual Report and in the Laboratory's Site Annual Environmental Report (SAER).

4.3 Process for Compliance

To demonstrate compliance, answers to the following questions must be provided by the responsible program:

- What is the building number and room number in which the operation/ experiment takes place?
- What radionuclides are being used?
- What is the quantity of each radionuclide being used (expressed in curies)?
- What is the physical state (solid, liquid, powder, gas) of each radionuclide being used? (Give fraction of time in different states, if applicable.)
- What is the type of area where the operation takes place (fume hood, glove box, open air, etc.)?
- What are the characteristics of the release points (stack height relative to ground, stack diameter, stack flow rate, and exhaust identification number)?
- Are there emission control (abatement) devices? (HEPA filter(s), Venturi scrubbers, Douglas bags, activated carbon filters, etc.)
- What is the efficiency of the abatement equipment? (For example, 99.97 percent for one-stage HEPA.)
- What is the maximum frequency of emissions? (For example, is it a one-time puff, continuous, 4 hours/day, 2-5 days/month, etc.?)
- Describe the project or experiment. (What does it do? Does it produce any activation products? Does it produce any waste? Does it involve heating, melting, or vaporization of radioactive substances?)
- When will the equipment be installed? When do you expect operations will be ready to commence?

4.4 Applicability to LLNL Activities

Currently, LLNL has many Radioactive Materials Management Areas (RMMAs) and potential release or emission points. LLNL activities that may emit radioactive pollutants require annual evaluation. New or modified operations may require EPA approval for start-up or continuous effluent monitoring systems. Failure to comply with these requirements may result in penalties, fines, and adverse publicity. In a case of extreme and continuing violations, the EPA could shut down a process and possibly a facility.

5.0 Work Standards

5.1 Work Smart Standards

40 CFR 60, Standards of Performance for New Stationary Sources

40 CFR 61, National Emission Standards for Hazardous Air Pollutants

40 CFR 63, National Emission Standards for Hazardous Air Pollutants for Source Categories

40 CFR 82, Protection of Stratospheric Ozone

42 USC § 7401 et seq., Clean Air Act (CAA)

42 USC § 7671 et seq., Clean Air Act amendments of 1990

CA Health & Safety Code §§ 40825-40843, Hearing Boards, Procedures

CA Health & Safety Code §§ 40918-40925.5, District Plans to Attain State Ambient Air Quality Standards

CA Health & Safety Code §§ 41700-41704, Emission Limitations, General Limitations

CA Health & Safety Code §§ 41750-41755, Emission Limitations, Portable Equipment

CA Health & Safety Code §§ 41800-41804, Non-agricultural Burning Requirements

CA Health & Safety Code § 41950, Gasoline Vapor Control

CA Health & Safety Code §§ 42300-42314.1, Enforcement, Permits

CA Health & Safety Code §§ 44300-44346, Air Toxics "Hot Spots" Information and Assessment

CA Health & Safety Code §§ 44360-44384, Air Toxics "Hot Spots" Information and Assessment, Risk Assessment, Fees and Regulations

17 CCR §§ 60030-60053, Administrative Procedures [Permitting Requirements]

17 CCR §§ 80100-80175, Agricultural Burning Guidelines

17 CCR §§ 90700-90702, Air Toxics (Hot Spots) Fee Regulation

17 CCR §§ 91100-91220, Determination of Emission

17 CCR §§ 92000-92540, Abrasive blasting

17 CCR §§ 93000-93110, Air Resources Board [Control of Toxic Air Contaminants]

17 CCR §§ 93300-93355 and appendices, Emission Inventory Criteria and Guidelines

Bay Area Air Quality Management District (BAAQMD) Regulation 1, General Provisions and Definitions § 1-112 to 1-441 (Breakdown to Right of Access to Information)

Bay Area Air Quality Management District (BAAQMD) Regulations 1–12, Regulations and permitting requirements

San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Regulations Rules 1010–9120, Regulations and permitting requirements

San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rule 1100, Equipment Breakdown

5.2 Other References

Bay Area Air Quality Management District Quality Handbook

Biermann, A.H., G.M. Gallegos, R.J. Harrach, N.A. Bertoldo, L.C. Hall, R.L. Berger, and K.A Surano (1999), *LLNL NESHAPs 1998 Annual Report*, Lawrence Livermore National Laboratory, Livermore, CA (UCRL-ID-113867-99)

Larson, J.M., R.J. Harrach, P.E. Althouse, N.A. Bertoldo, A.H. Biermann, R.G. Blake, E.R. Brandstetter, S.L. Brigdon, R.A. Brown, E. Christofferson, K.J. Folks, G.M. Gallegos, L.M. Garcia, T.A. Giesing, A.R. Grayson, L.C. Hall, D.H. MacQueen, S. Mathews, S.R. Peterson, M.J. Taffet, P.J. Tate, R.J. Vellinger, and R.J. Ward (1999), *Environmental Report 1998*, Lawrence Livermore National Laboratory, Livermore, CA (UCRL-50027-98).

6.0 Resources for More Information

6.1 LLNL Contacts

Your supporting ES&H Team environmental analyst can provide the TAMM Group air specialist contact for air permits or analyst regarding release to air of radioactive pollutants for your area.

The TAMM air permits specialist supports your program for the following:

- Obtain, renew, and close out local district permits.
- Clarify the conditions of a permit.
- Aid in the design of record-keeping logs.
- Clarify application rules/regulations relative to your equipment/operation.

The TAMM analyst supports project participants for the following:

- Assess potential radionuclide emissions.
- Evaluate obligations (if any) to install continuous monitoring and/or to report to the EPA and receive permission to proceed.
- Provide regulatory interaction, if needed.
- Demonstrate compliance with radiological NESHAPs requirements annually.

7.0 LLNL Air Emissions Offsets Management Plan

The LLNL Air Emissions Offsets Management Plan can be found at the following Internet address:

http://www.llnl.gov/es_and_h/hsm/doc_31.01/air.html